## REMARKS

The is a supplement to the response filed on August in response to the Office Action dated May 10, 2004 and the telephone interview with the Examiner on August 18, 2004, regarding the above identified application. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 1-4 and 9-31 are under consideration in this application. Claim 1 and 18 are being amended, as set forth above and in the claim amendments, in order to more particularly define and distinctly claim Applicants' invention. A new claim 31 is being added to recite another embodiment described in the specification.

Additional Amendments

The claims are being amended to correct formal errors and/or to better disclose or describe the features of the present invention as claimed. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

Claims 1-3 and 5-7 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,106,784 to Lund et al. (hereinafter "Lund") and US Pat. No. 6,632,653 to Astle (hereinafter "Astle") respectively. Claim 5 was further rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,093,370 to Yasuda et al (hereinafter "Yasuda") as defined by Physics: Principles with Application by Giancoli DC (1991), and Claim 8 was further rejected under 35 U.S.C. § 102(e) as being anticipated by Yasuda as defined by Giancoli and Handbook of Chemistry & Physics. Claims 6-7 and 9-12 remain rejected under 35 U.S.C. § 103(a) as being unpatentable over Yasuda as defined by Giancoli in view of U.S. Pat. No. 6,051,380 Sosnowski et al. (hereinafter "Sosnowski"). Claims 9-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Astle in view of Sosnowski.

During the telephone interview, the Examiner commented that it is known in the art to place a cover over a biochemical reaction detection apparatus such that one skilled in the art can be motivated to combine a cover on the apparatus of Lund or Astle which constitute103 rejections. The Examiner

also commented that each thermal transfer station 240 can be interpreted to be an inland with a plurality of probe cells 32 which can be viewed together liquidly communicating with each other in the liquid chamber 260 clamped to the carrier tape 20 and covered by the heat exchange reservoir 272 (Fig. 4; col. 5, lines 22-26). These rejections have been carefully considered, but are most respectfully traversed.

The biochemical reaction detection apparatus (e.g. Fig. 2B; page 26, 2nd-3rd paragraphs) of the invention as now recited in claim 5, comprises: a first membrane 22; a plurality of islands 21 provided on one side of said first membrane 22; probe cells for immobilizing probes for detecting biochemical reactions, each of said probe cells being provided on a side opposite to said one side of said first membrane 22 corresponding to one of the islands 21 through a cross section of the first membrane; and a cover 27 placed on top of the probe cells for accommodating a sample solution layer 26 between the cover 27 and said side opposite to said one side of said first membrane 22 covering all of the probe cells (Fig. 2B; "*Sample solution 26 is preferably added in the amount sufficient for making the solution layer with a thickness of 10-100 μm After addition of sample solution 26, a glass cover 27 is placed thereon*" p. 13, last line to p. 14, 1st line; p. 26, last two lines; Example 5: pp. 36-40). The islands are spaced from each other (page 6, line 15) with intervals (claim 5), and each of the islands includes a temperature controller for heating and temperature-controlling a corresponding one of said probe cells independently so that the temperature of the sample solution is controlled independently cell by cell (e.g., page 6, line 17; e.g., Fig. 13; "*evaluating 1 kind of sample DNA using 8-base probes*" p. 39, lines 2-3).

For example, a DNA chip in Fig. 13 having 36 probe cells, comprising 4 kinds of probes (probe 2 through probe 5) immobilized on 9 probe cells per each kind of probes. A sample solution is injected onto this chip for hybridization. The temperature for hybridization is set within the range of 10-50°C for each column at intervals of 5°C for the probe cells arranged forming column a through column i (10°C for column a, 15°C for column b, 20°C for column c, . . . 45°C for column h, 50°C for column i). p. 37, 3rd paragraph.

The invention is also directed to a biochemical reaction detection apparatus, as now recited in claim 18, comprising: a first membrane, a first side thereof being provided with a sample solution layer; a plurality of islands provided on a second side of said first membrane opposite to the first side of said first membrane; probe cells for immobilizing probes for detecting biochemical reactions, each of said probe cells being provided on the first side of said first membrane corresponding to one of the islands through a cross section of said first membrane, each of said probe cells being set to contact with said sample solution layer. The islands are spaced from each other with intervals filled with air, and each of the islands includes a temperature controller for heating and temperature-controlling a corresponding

one of said probe cells independently so that the temperature of the sample solution is controlled independently cell by cell.

The invention is also directed to a biochemical reaction detection apparatus, as now recited in claim 31, comprising all the elements of claim 18 except a first membrane with a first side thereof being set to be provided with a sample solution layer, and reaction products of polylysine and functional groups not binding with the probes on the first side of said first membrane ("*for reducing the background resulting from the non-specific absorption during the process of hybridization with samples*" p.34, 1st paragraph).

None of the cited prior art references teaches or suggests: claim 1: providing such a cover placed on top of the probe cells for accommodating a sample solution layer between the cover and said one side of said first membrane covering ALL of the probe cells; claim 18: such a first side thereof being provided with a sample solution layer and each of said probe cells being set to contact with said sample solution layer; and claim 31: such a first membrane with a first side thereof being set to be provided with a sample solution layer, and reaction products of polylysine and functional groups not binding with the probes on the first side of said first membrane, in conjunction with "each island being provided across a membrane from one corresponding probe cell and having a temperature controller for heating and temperature-controlling the corresponding probe cell independently so that the temperature of the sample solution is controlled independently cell by cell" according to the invention.

In contrast, Lund uses a titration plate 19 to ensure the solutions 28 in different probe wells are separated from one another (Figs. 2 & 13), rather than having any cover placed on top of the probe cells for accommodating ONE sample solution layer between the cover and the membrane covering all the probe cells as the invention (claim 1) or any such sample solution layer so positioned (claim 18). In addition, Lund merely controls the temperature of the respective solution in each probe well, rather than "the temperature of the common sample solution being controlled independently cell by cell." Lund also fails to teach any reaction products of polylysine and functional groups not binding with the probes on the first side of said first membrane (claim 31).

Applicants further contend that one skilled in the art would not combine a cover with Lund as suggested by the Examiner as the proposed combination of references would mix all the different sample solutions thus totally destroying its intended purpose of separating the different sample solutions. It is well established that a rejection based on a principle that contradicts the teachings of the present invention is improper.

Astle, when viewing each thermal transfer station 240 as an inland, each alleged island has

a plurality of probe wells 32 "*embossed into the web [30], or thermoformed in the web, in patterns of 16*24 matrixes* (col. 3, lines 29-31)," then added with reagents and sealed with a seal layer (claim 1, (c)) to seal the reagents between the wells and the seal layer (col. 3, lines 34-35) such that the regents in one well are fluidly separately from reagents in another well. The reagents are sealed/ separated in each well, rather than fluidly communicating via a common sample solution layer. In the embodiment shown in Fig. 4, "*an elastomeric gasket 280 effects a liquid tight seal between the upper edges of heat exchange reservoir 272 and the bottom of carrier tape 20. The heat transfer medium [e.g., water (col. 5, line 48)] in heat exchange reservoir 272 is in direct contact with reagent wells 32 protruding from the bottom of carrier tape 20* (col. 5, lines 30-35)." The heat transfer medium/water (rather than any "sample solution") in the liquid chamber 260 only contacts the back/bottom of the wells, rather than fluidly communicating with the reagents in the wells from the front of the wells as the sample solution of the invention. Astle does not have any cover placed on top of the probe cells for accommodating ONE sample solution layer between the cover and the membrane covering all the probe cells as the invention (claim 1) or any such sample solution layer so positioned (claim 18). In addition, Astle merely controls the temperature of the respective solution in each thermal transfer station 240 with a plurality of wells, rather than just one well/cell such that it does not control "the temperature of the common sample solution being controlled independently cell by cell." Astle also fails to teach any reaction products of polylysine and functional groups not binding with the probes on the first side of said first membrane (claim 31).

Applicants further contend that one skilled in the art would not combine a cover with Astle as suggested by the Examiner as the proposed combination of references would mix all the different sample solutions, thus totally destroying its intended purpose of separating the different sample solutions by a seal layer or a backup plate 270. It is well established that a rejection based on a principle that contracts the teachings of the cited references is improper.

The other cited prior art references fail to compensate for the above-discussed deficiencies.

Accordingly, Applicants contend that the cited conflicting teachings of the prior art references would not motivate their combination such that their combination would embody each and every feature of the present invention as now claimed in claims 1, 18, 31 and from which claims 2-4 and 9-30 depend. Such differences are more than sufficient that the present invention as now claimed would not have been rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

Respectfully submitted,

Stanley P. Fisher
Registration Number 24,344

Juan Carlos A. Marquez
Registration Number 34,072

**REED SMITH LLP**
3110 Fairview Park Drive, Suite 1400
Falls Church, Virginia 22042
(703) 641-4200

**August 25, 2004**

SPF/JCM/JT